

*English Translation of Taiwanese Patent 129094*

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Docket #4594  
USPN 10/713,955  
A.U. 2839  
Conf. #2886

3/13/01

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ENGLISH TRANS. OF  
TW 129094ELECTRICAL CONNECTOR WITH A DEFLECTABLE SHUNT

This invention relates to an electrical connector assembly formed of two mating connectors, one connector having a deflectable shunt for commoning at least two terminals when unmated, the other connector deflecting the shunt during engagement. More particularly, this invention relates to a pull to seat connector assembly in which terminals are loaded in one housing from the mating side and the deflectable shunt is in the other connector.

U.S. Patent Application Serial No. 049,633 filed May 13, 1987 discloses an electrical connector assembly in which the receptacle connector contains at least one spring loaded deflectable shunt. That spring loaded deflectable shunt engages receptacle terminals in the one connector when that connector is disengaged from a mating connector. Upon engagement with a mating connector containing a plurality of pins, the deflectable shunt engages a camming member located adjacent the pins to deflect the shunt out of contact with all of the terminals in the first connector. A connector of that type is especially useful in certain automotive applications. For instance, the connector can be used as part of an airbag safety system. The shunted configuration can be employed to detect an unmated or partially mated configuration and can be employed to prevent inadvertent actuation of the airbag system during servicing.

The airbag connector previously referred to is in other respects a standard connector in which the receptacle terminal contacts are crimped to individual wires and then inserted into the connector housing from the rear. So-called pull to seat connectors have been proposed as an alternative to such crimp-snap configurations. A pull to seat connector is a connector in which an unterminated wire is first inserted through an insulating housing from the rear so that the free end of the wire projects beyond the mating face of the housing. The terminals are then crimped to the wires and the wires are pulled to withdraw the terminals into the connector housing. So-called pull to seat connectors provide more secure engagement of the terminal with the housing and simplify the construction of the insulative housing.

The instant invention is directed to an electrical connector assembly having a deflectable shunt in one of two matable connectors. The other matable connector can comprise a pull to seat connector, the so-called pull to seat connector having a cap which can be secured to the mating face of the connector. The cap has ramp surface oriented to engage the deflectable shunt when the two connectors are mated. In the preferred embodiment of this invention, the deflectable shunt comprises a cantilever beam having laterally extending arms which engage separate connectors. The cap has a ramp surface which engages the central beam of the deflectable shunt. Suitable clearance is provided for the laterally extending arms.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a pull to seat connector showing a cap member exploded from the mating face of the connector.

Figure 2 is an exploded view, partially in section, of the connector assembly showing the deflectable shunt in one of the connectors.

Figure 3 is a sectional view of the connectors in alignment prior to mating.

Figure 4 is a view of the fully mated connector assembly showing the shunt biased out of engagement with the terminals in each connector.

The electrical connector assembly 2 comprises a first mating electrical connector 4 and a second mating electrical connector 6. The first electrical connector 4 includes a plurality of contact terminals 8 in the form of a plurality of pins located in at least one row. The second electrical connector 6 includes a like plurality of receptacle terminals 10 each crimped to a single conductor such as an insulated wire. Terminals 8 in the first connector 4 are located within an insulative housing 12, and terminals 10 of the second connector 6 are similarly located in an insulative housing 14 matable with the insulative housing 12 so that the two connectors 4 and 6 can be mated by bringing the mating faces of the connectors into engagement. The connector assembly further comprises a spring biased shunt 16 in the first connector 4. Shunt 16 engages at least two of

the terminals 8. An insulative cap 18, which is securable to the mating face of the second connector 6, is also a part of the connector assembly. The terminals 8, 10 and the shunt 16 are stamped and formed from a conventional spring metal material. Housings 12, 14 and the cap 18 are likewise formed of conventional insulative materials suitable for use in electrical connector assemblies.

While the terminals 8 in the first connector 4 can comprise a simple blade or pin contact, such as a contact which can be soldered to a printed circuit board, the terminals 8 in the second connector 6 comprise stamped and formed receptacle contacts. Terminals 10 have a front or mating receptacle contact portion 10a which includes a folded over spring section 10b located within the generally box-shaped configuration of contact portion 10a. A standard wire crimp 10c is located intermediate the ends of terminal 10 for engagement with the conductive core of a single wire. An insulation crimp or strain relief section 10d is located adjacent the rear end of each terminal 10.

Insulative housing 12 includes a mating face 12a and an opposite rear face 12b which, in the preferred embodiment of this invention, can be mountable on a printed circuit board. The individual pin terminals 8 protrude from a mating wall 12c intermediate the ends of the housing 12 into a cavity 12d which opens onto the mating face 12a. The shunt 16 similarly protrudes from the mating wall 12c into cavity 12d where engagement can be established with at least two pin terminals 8. The cavity 12d, which opens onto the mating face 12a of the first connector 4, is dimensioned to permit insertion of the first connector 6 when the two connectors 4 and 6 are mated.

The second or receptacle connector 6 has an insulative housing 14 with a mating face 14a and an opposite rear or wire receiving face 14b. A plurality of terminal passages 14c extend between the mating face 14a and the rear or wire receiving face 14b. A restricted portion of each terminal passage 14c is located adjacent the rear face 14b to form a terminal stop 14d. The restricted portion adjacent the rear face 14b is smaller than the diameter or width of an individual terminal 10 so that the terminals can only be inserted into the connector housing 14 through the mating face 14a. The presence of

this stop 14d will then permit withdrawal of the crimped terminal 10 through the rear face of the housing. The second connector 6 thus comprises a pull to seat connector in which a conductor must first be inserted into passages 14c through the rear face 14b until the free end of the terminal extends beyond the mating face 14a. A terminal 10 is then crimped onto the free end of each wire with the crimp portion 10c engaging the conductive core of each wire and with the insulation barrel or strain relief 10d engaging the insulation. The wire is then pulled back to draw each terminal 10 into a corresponding terminal passage 14c until the rear insulation barrel portion 10d abuts the shoulder 14d to prevent further rearward movement of each terminal 10. The contact portion 10a then faces the mating face 14a and the spring contact 10b is accessible through the mating face 14a of the housing 14. An elongate recess 14e is located along the mating face 14a below the terminal receiving passages 14c. A downwardly sloping 14f is located along the top of the shunt recess 14e and below the lower wall of each passage 14c. The contour of the mating face 14a of the second housing 14 is such that the mating face 14a can be at least partially received within the cavity 12d in the first connector housing 12.

The spring biased shunt 16 comprises a longitudinally extending central beam 16a with a plurality of arms or wings 16b extending laterally therefrom. In the preferred embodiment of this invention, the spring biased shunt extends from the mating wall 12c of the first connector housing 12 into cavity 12d. At the point where the longitudinal extending beam 16a extends from the mating wall 12c, the shunt is spaced below the pins 8 which are to be commoned by the shunt 16. A portion of the shunt located within cavity 12d is generally arcuate, forming a crown at its uppermost extent. The laterally extending arms or wings 16b are located at the uppermost extent of crown 16c of the longitudinally extending beam 16a. In the preferred embodiment of this invention, the longitudinally extending beam 16a is located laterally between adjacent pins 8. The laterally extending arms 16b thus extend from the crown section 16c so as to overlap adjacent pins 8. Since the shunt 16 is normally biased upward, the wings 16b thus engage the two adjacent pins 8 to be commoned when the first connector 4 is disengaged from the second connector 6.

The cap 18 performs two functions. First, the cap is securable to the mating face 14a of the second housing 14 to retain the terminals 10 within terminal receiving passages 14c so that forward movement of the terminals out of mating face 14a is not permitted. The cap 18 also serves to deflect the shunt 16 out of engagement with pins 8 when the first connector 4 is mated to the second connector 6. The cap 18 is secured to the mating face 14a of the second housing 14. The cap 18 has at least one ramp surface 18a extending between opposite faces of the cap 18 and oriented for engagement with the arcuate portion of the longitudinally extending beam 16a. It is this ramp surface 18a which will initially engage the longitudinally extending beam 16a to move the shunt 16 out of engagement with pins 8. A plurality of openings 18b are located in the cap 18 and are oriented to receive the respective pins 18 and align pins 18 for engagement in the contact portions 10a of receptacle terminals 10. A shunt clearance opening 18c is located below the two terminal receiving openings 18b which are intended to receive the two aligned pins 8. The housing may be extended below the two openings 18b which will receive shunted pins 8 to form a continuation of the ramp surface 18a, thus ensuring that shunted pins 8 will be aligned with corresponding terminals 10. A plurality of retention fingers 18f extend from the rear mating face of the cap 18 and are oriented for insertion into the forward portion of the individual terminal receiving passages 14c. These retention fingers 18f are dimensioned to be tightly received within the terminal receiving passages 14c to secure a tight frictional or interference fit between the retention cap and the housing 14. Thus, the cap will serve to tightly secure the terminals 10, preventing movement of the terminals out of the mating face 14a of housing 14.

When the first and second connectors 4 and 6 have been fully mated, the shunt 16 is at least partially received within recess 14e after having been deflected out of engagement with pins 8 by the ramp surface 18a. The pins 8 are received within the receptacle contact portion 10a and a resilient contact is established by the deflectable spring 10b. The mating face 14a of housing 14 and the cap 18 are received within the cavity 12d. As shown in Figure 4, the front face

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of the cap 18 can be in engagement with the mating wall 12c at the rear of the cavity 12d. The first connector 4 is secured to the second connector 6 by a deflectable latch 14g located on the exterior of housing 14. It will be apparent to one of ordinary skill in the art that the aforementioned elements could be combined into other configurations to perform substantially the same function in substantially the same manner. Therefore, the claims presented herein are not limited to the single preferred embodiment depicted herein which comprises the best mode of practicing the instant invention.

## 專利申請案第 78 203326 號

RCC Patent Application No. 78 203326

申請專利範圍英文修正本一附件(二)

Amended Claims in English - Encl. (II)

(民國七十八年十二月六日修正並送呈)

(Amended &amp; Submitted on December 6, 1989)

Amended Claims:

1. An electrical connector assembly 2 comprising first and second mating electrical connectors 4, 6, each connector having a plurality of terminals 8, 10 positioned within an insulative housing 12, 14, the first connector 4 having a spring biased shunt 16 engagable with two terminals, the second connector 6 including a cap 18 securable to a mating face 14a thereof, the cap 18 having a ramp surface 18a, the spring biased shunt 16 being engagable with the ramp surface 18a of the cap when the first connector 4 is mated with the second connector 6 to move the shunt 16 out of engagement with the terminals 8 in the first connector 4 when the first and second connectors are mated, the terminals 10 in the second connector 6 being insertable into the second connector housing 14 through the mating face 14a thereof.
2. The electrical connector assembly 2 of claim 1 wherein the shunt 16 comprises a longitudinally extending beam 16a positioned between two terminals in the first housing 12 with arms 16b extending laterally of the beam 16a to engage the two terminals, the beam 16a being engagable with the ramp surface 18a to move the two arms 16b out of engagement with the two terminals when the first and second connectors 4, 6 are mated.
3. The electrical connector assembly 2 of claim 1 wherein the second connector 6 comprises a pull to seat connector.
4. The electrical connector of claim 1 wherein the second connector 6 comprises a pull to seat connector, the cap 18 being securable to the second connector so that the mating side of the cap is opposed to a free end of each second connector terminal 10, the cap 18 comprising means to retain the second connector terminals 10 in the second connector insulative housing 14.
5. The electrical connector assembly 2 of claim 2 wherein the second connector 6 has a camming surface 14f on a mating face 14a, the cap 18 having a recess 18c of sufficient width to permit passage of the shunt 16 through the cap 18, the recess 18c in the cap 18 being aligned with the camming surface 14f, the spring biased

shunt 16 being engagable with the camming surface 14f when the first connector 4 is mated with the second connector 6.

6. The electrical connector assembly 2 of claim 5 wherein the width of the recess 18c in the cap is at least equal to the lateral extend of the shunt arms 16b.

7. The electrical connector assembly 2 of claim 6 wherein one side of the cap recess 18c forms a ramp surface 18a aligned with the camming surface 14f, the shunt beam 16a engaging the ramp surface 18a before engaging the camming surface 14f.

8. The electrical connector assembly 2 of claim 1 wherein the shunt comprises a deflectable cantilever shunt 16 having a longitudinally extending beam 16a and arms 16b extending laterally from the beam 16a, the arms 16b being engagable with two terminals 8, the longitudinally extending beam 16a of the deflectable cantilever shunt 16 and the two terminals 8 extending from an intermediate wall 12c into a cavity 12d on a mating face 12a of the first connector housing 12, the second connector 6 including a surface 18a, 14f on a mating face 14a, the first and second connectors being matable with the longitudinally extending beam 16a in alignment with the surface 18a, 14f so that the longitudinally extending beam 16a is engagable with the surface 18a, 14f when the first connector 4 is mated with the second connector 6 to move the deflectable cantilever 16 shunt out of engagement with the terminals 8 in the first connector 4 when the first and second connectors are mated.

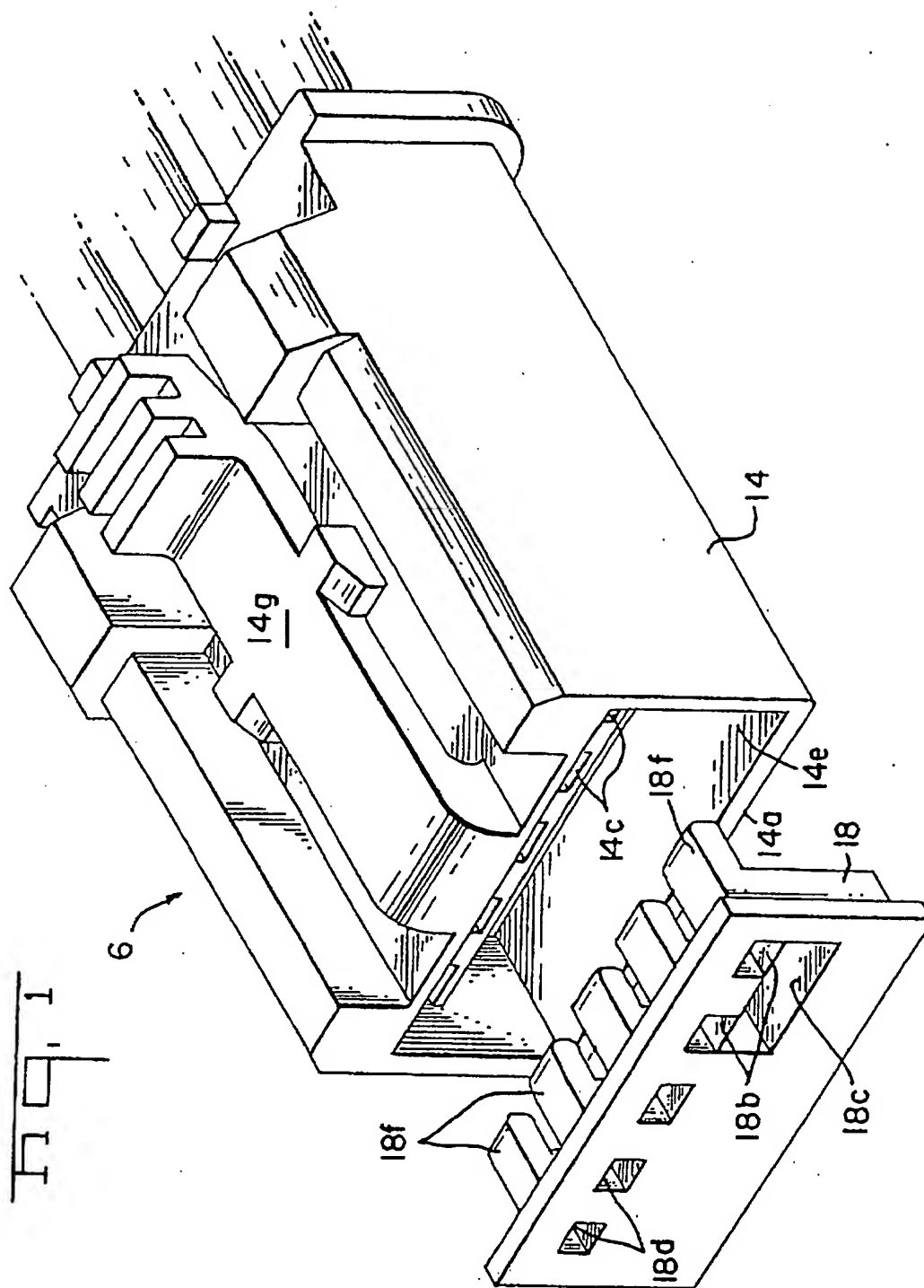


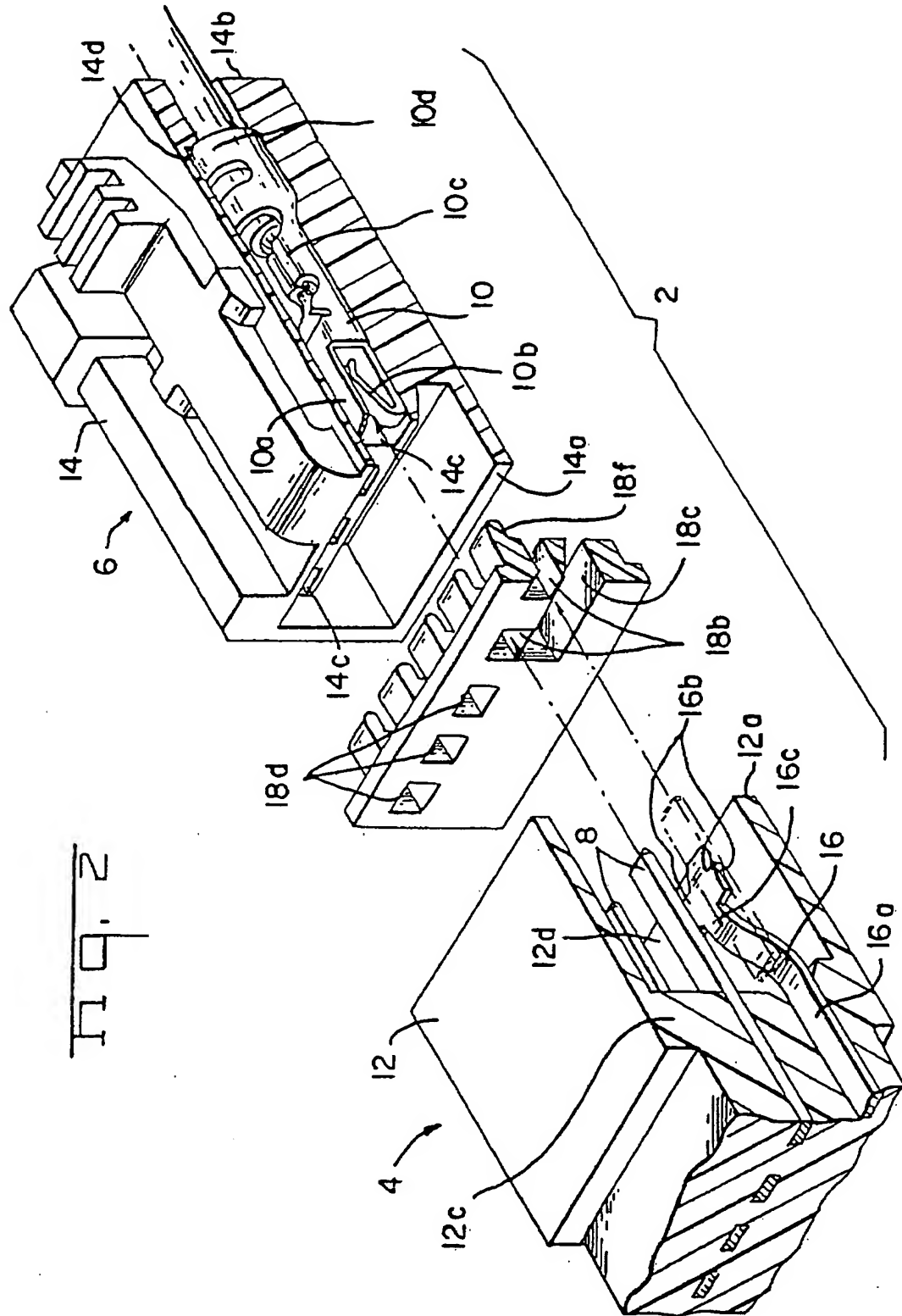
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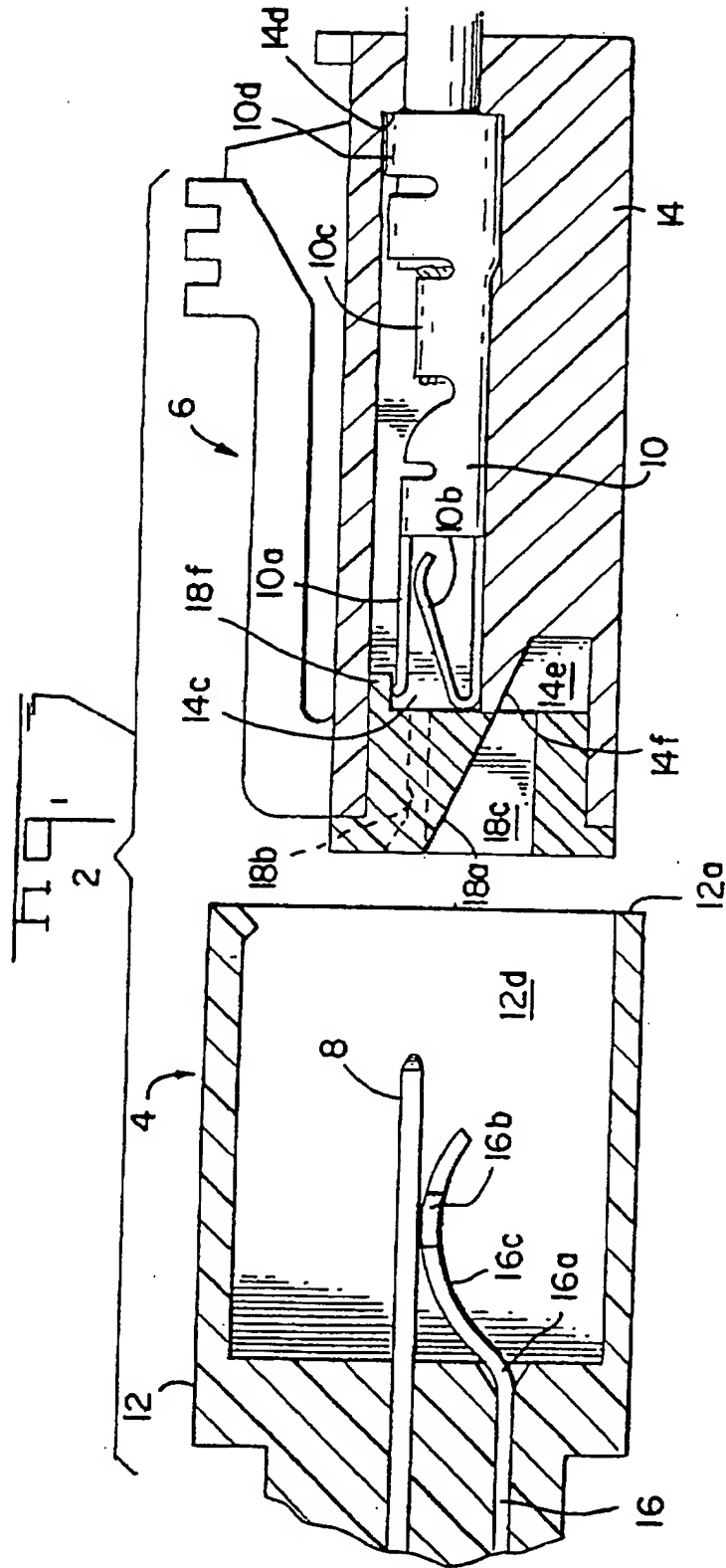
**ABSTRACT**

A connector assembly 2 comprises one electrical connector 4 having at least two terminals 8 shunted in the unmated configuration and a second pull to seat connector 6. The shunt 16 in the first connector 4 comprises a longitudinally extending beam 16a having laterally extending contact arms 16b which engage adjacent terminals 8 in the unmated configuration. A cap 18, which can be secured to the mating face 14a of the second connector 6 after terminals 10 are withdrawn into the connector 6 through the mating face, contains a ramp surface 18a which engages the longitudinally extending beam 16a of the deflectable shunt 16 when the two connectors are mated. Clearance is provided on the mating face of the pull to seat connector 6 so that the deflectable shunt 16 is maintained out of engagement with the pins and receptacle terminals 8, 10 in the first and second connectors 4, 6.

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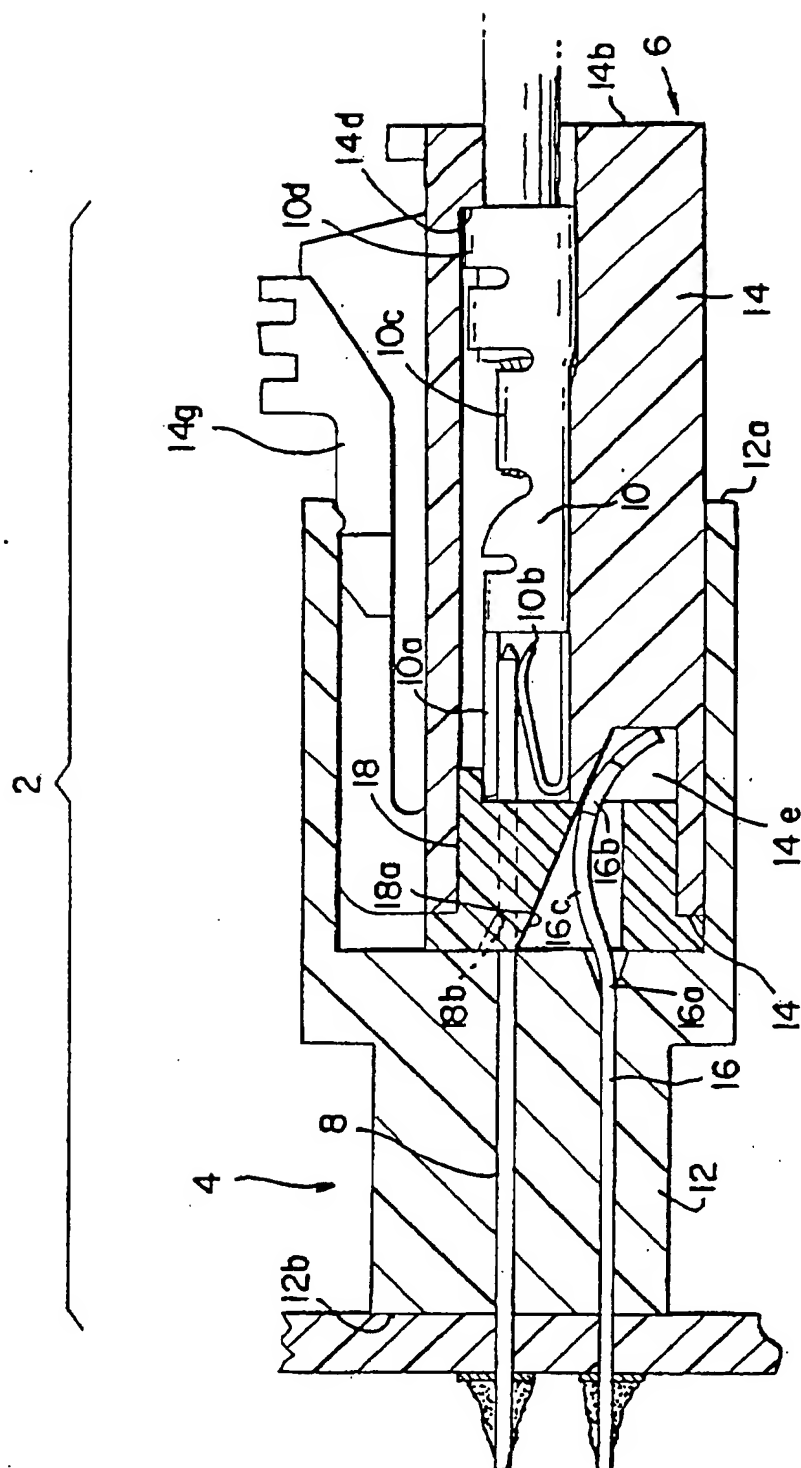


FIG. 4

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(44) 中華民國79年(1990)02月11日

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(51) Int. Cl.: H01R

全 3 頁

(54) 名 稱: 具一可撓曲分流器之電連接器

(21) 申 請 案 號: 78203326 (22) 申請日期: 中華民國78年(1989)04月15日

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## (57) 申請專利範圍:

1. 一種電連接器總成2包含第一及第二電連接器4、6，每一連接器有若干端子8、10位於一絕緣外殼12、14內，第一連接器4有一彈簧偏壓分流器16可貼接二端子，第二連接器6包括一蓋18可固著至其配合面14a，蓋18有一傾斜表面18a，當第一連接器4配合於第二連接器6時彈簧偏壓分流器16係可貼接於蓋之傾斜表面18a，而於第一及第二連接器配合時使分流器16移動與端子8脫離貼接，第二連接器6上之端子10係可經由其配合面14a插入第二連接器外殼4內。
2. 如申請專利範圍第1項之電連接器總成2，其中分流器16包含一縱向伸延橫桿16a位於第一外殼12內之二端子之間，而以一橫桿16b橫向於橫桿16a伸延以貼接二端子，橫桿16a係可貼接傾斜表面18a，於第一及第二連接器4、6配合時使二橫桿16b移動與二端子脫離貼接。
3. 如申請專利範圍第1項之電連接器總成2，其中第二連接器6包含一拉至定位之連接器。
4. 如申請專利範圍第1項之電連接器2，其中第二連接器6包含一拉至定位之連接器，蓋18係可固著至第二連接器，因而蓋之配合側面係相反於每一第二連接器端子10之自由端，蓋18包含使第二連接器端子10在第二連接器絕緣外殼14內固定之裝置。
5. 如申請專利範圍第2項之電連接器總成2，其中，第二連接器6在一配合面14a上有一凸輪動作表面14f並包括一蓋18可固著至其配合面14a，蓋18有一凹口18c其寬度足夠容許分流器16通過蓋18，蓋18上之凹口18c係對正於凸輪動作表面14f，在第一連接器4配合於第二連接器6時彈簧偏壓分流器16係可貼接於凸輪動作表面14f。
6. 如申請專利範圍第5項之電連接器總成2，其中，蓋上凹口18c之寬度至少等於分流器16b之橫向範圍。
7. 如申請專利範圍第6項之電連接器總成2，其中蓋凹口18c之一側形成一傾斜表面18a對正於凸輪動作表面14f，分流器橫桿16a在貼接凸輪動作表面14f前貼接傾斜表面18a。
8. 如申請專利範圍第1項之電連接器總成2，其中分流器包含一可撓曲懸臂分流器16，此分流器有一縱向伸延橫桿16a及由橫桿

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16 a 橫向伸延之臂 16 b, 臂 16 b 係可貼接於二端子 8 由一中間壁 12 c 伸入第一連接器外殼 12 配合面 12 a 上之腔 12 d 內, 第二連接器 6 包括一在配合面 14 a 上之表面 18 a、14 f, 第一及第二連接器係可配合縱向伸延橫桿 16 a 對正於表面 18 a、14 f, 因而當第一連接器 4 配合於第二連接器 6 時縱向伸延橫桿 16 a 係可貼接於表面 18 a、14 f, 而於第一及第二連接器配合時便可撓曲懸臂分流器 16, 移動與第一連接器 4 上之端子 8 脫離貼接。

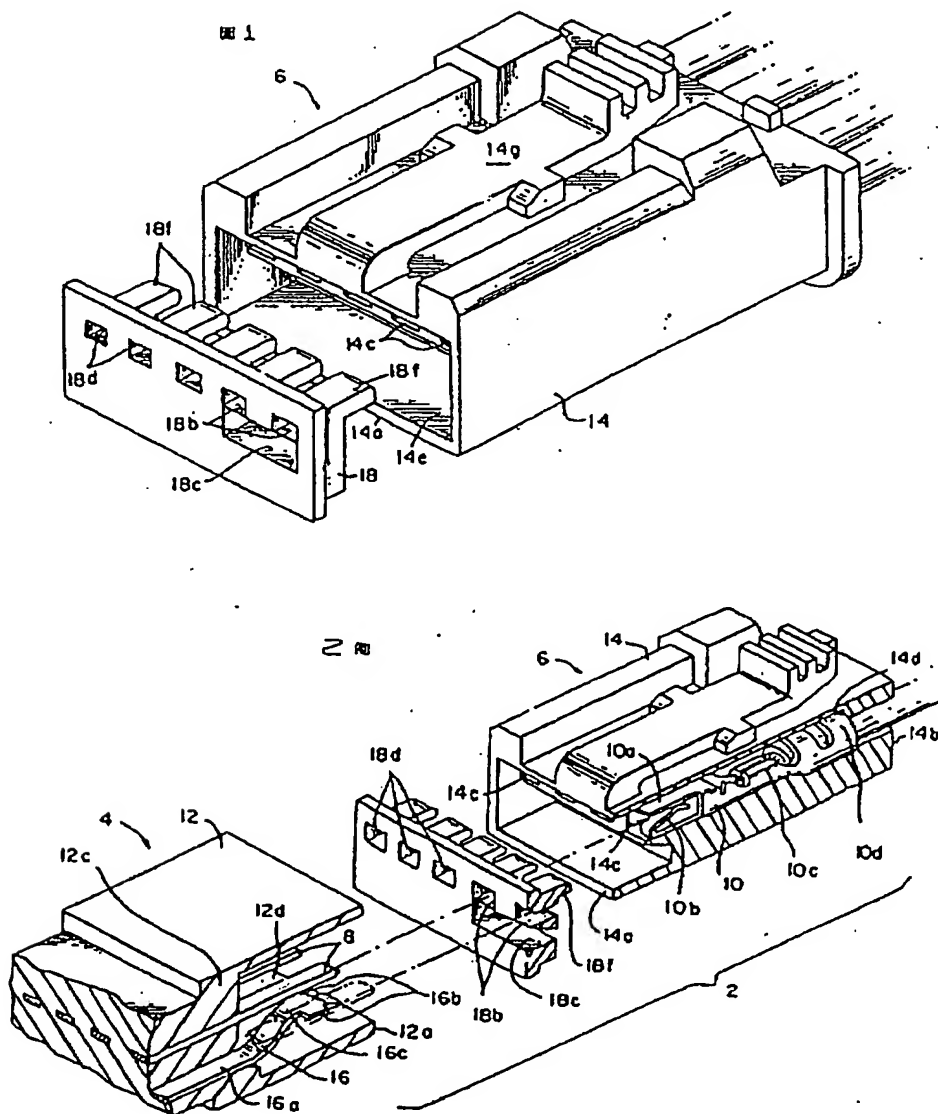
圖示簡單說明：

圖 1 為拉至定位之連接器之透視圖, 示一由連接器配合面所分解之基構件。

圖 2 為連接器總成之分解圖, 部份為剖面, 示連接器之一上之可撓曲分流器。

圖 3 為在配對前二連接器對正之剖面圖。

圖 4 示完全配合之連接器總成之圖, 示分流器被偏壓而與每一連接器中之端子脫離接合。



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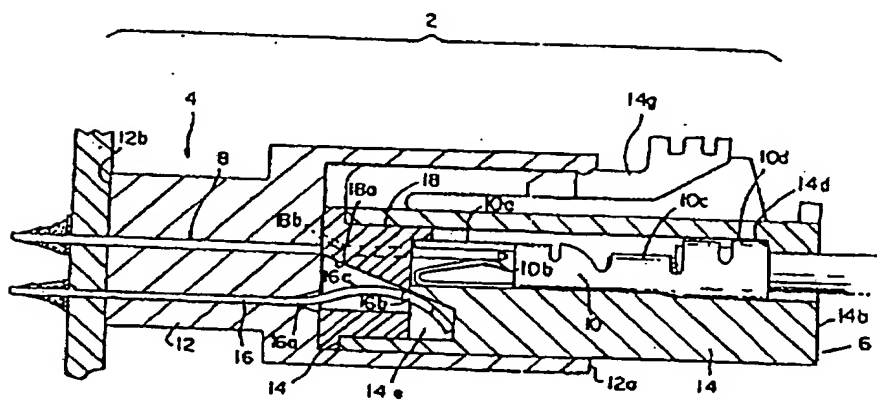
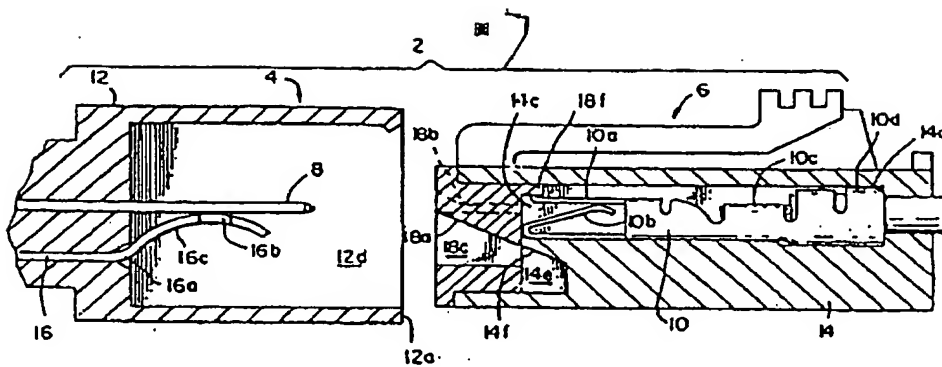


Fig. 4